

CLAIMS

1. In a multiple-access OFDM-CDMA system, a method for recovering data transmitted over a wireless communication channel, comprising:
 - processing a received signal to provide data samples;
 - transforming the data samples in accordance with a particular transformation to provide transformed samples;
 - despreading the transformed samples with one or more sets of despreading coefficients to provide despread samples, wherein each set of despreading coefficients is associated with a respective despreading code that corresponds to a spreading code used to spread data prior to transmission and selected from a set of available spreading codes;
 - combining the despread samples for each time interval to provide a demodulated symbol representative of a transmitted OFDM symbol; and
 - decoding demodulated symbols to provide decoded data.
2. The method of claim 1, further comprising:
 - discovering the data samples with a cover code to provide discovered samples, wherein the transforming is performed on the discovered samples.
3. The method of claim 1, further comprising:
 - discarding data samples corresponding to a cyclic prefix appended to each OFDM symbol.
4. The method of claim 1, wherein the transformation is a Fourier transform.
5. The method of claim 1, further comprising:
 - combining demodulated symbols derived from a plurality of received signals to provide combined demodulated symbols.
6. The method of claim 5, wherein the plurality of received signals are transmitted from a plurality of cells or sectors in the system.

7. The method of claim 1, further comprising:
estimating a response for the communication channel, and
wherein each set of despreading coefficients is derived based in part on a set of weights indicative of the estimated channel response.
8. The method of claim 7, wherein the channel response is estimated based on a pilot included in the received signal.
9. The method of claim 1, further comprising:
estimating a quality of the received signal; and
transmitting power control commands derived based on the estimated received signal quality.
10. The method of claim 9, wherein the received signal quality is estimated based on the demodulated symbols.
11. The method of claim 9, wherein the received signal quality is estimated based on a pilot included in the received signal.
12. In a multiple-access OFDM-CDMA system, a method for recovering data transmitted over a wireless communication channel, comprising:
processing a received signal to provide data samples;
discovering the data samples with a cover code to provide discovered samples;
transforming the discovered samples in accordance with a Fourier transform to provide transformed samples;
despreading the transformed samples with one or more sets of despreading coefficients to provide despread samples, wherein each set of despreading coefficients is associated with a respective despreading code that corresponds to a spreading code used to spread data prior to transmission and selected from a set of available spreading codes;
combining the despread samples for each time interval to provide a demodulated symbol representative of a transmitted OFDM symbol; and
decoding demodulated symbols to provide decoded data.

13. A receiver unit in a multiple-access OFDM-CDMA system, comprising:
 - a receiver operative to process a received signal to provide data samples;
 - a transformer operative to transform the data samples in accordance with a particular transformation to provide transformed samples;
 - a despreaders operative to despread the transformed samples with one or more sets of despreading coefficients to provide despread samples, wherein each set of despreading coefficients is associated with a respective despreading code that corresponds to a spreading code used to spread data prior to transmission and selected from a set of available spreading codes;
 - a first summer operative to combine the despread samples for each time interval to provide a demodulated symbol representative of a transmitted OFDM symbol; and
 - a RX data processor operative to decode demodulated symbols to provide decoded data.
14. The receiver unit of claim 13, further comprising:
 - a buffer operative to discard data samples corresponding to a cyclic prefix appended to each OFDM symbol.
15. The receiver unit of claim 13, further comprising:
 - a multiplier operative to deconvolve the data samples with a cover code to provide deconvolved samples, wherein the transformer is operative to transform the deconvolved samples.
16. The receiver unit of claim 13, further comprising:
 - a second summer operative to combine demodulated symbols derived from a plurality of received signals to provide combined demodulated symbols.
17. The receiver unit of claim 16, wherein the plurality of received signals are from a plurality of cells or sectors in the system.
18. A base station comprising the receiver unit of claim 13.
19. A terminal comprising the receiver unit of claim 13.

20. A receiver apparatus in a multiple-access OFDM-CDMA system, comprising:
- means for processing a received signal to provide data samples;
 - means for transforming the data samples in accordance with a particular transformation to provide transformed samples;
 - means for despread the transformed samples with one or more sets of despread coefficients to provide despread samples, wherein each set of despread coefficients is associated with a respective despread code that corresponds to a spread code used to spread data prior to transmission and selected from a set of available spread codes;
 - means for combining the despread samples for each time interval to provide a demodulated symbol representative of a transmitted OFDM symbol; and
 - means for decoding demodulated symbols to provide decoded data.